Final Record of Decision

NorthMet Project Land Exchange

Appendix C

Objections Process: Addressing Reviewing Officer Instructions

C.1 Introduction

The NorthMet Project Land Exchange Draft Record of Decision (ROD) was subject to the objection process, pursuant to 36 CFR part 218, subparts A and B. These regulations are available at: http://www.gpo.gov/fdsys/pkg/FR-2013-03-27/pdf/2013-06857.pdf .

Objections were accepted from two groups: individuals or entities who previously submitted timely and specific written comments (as defined by 36 CFR 218.2) about this proposed project or activity during scoping or any other designated public comment period in accordance with 36 CFR 218.5(a) or those individuals or entities who submitted objections based on new information. Issues raised in objections must be based on previously submitted timely, specific written comments regarding the proposed project unless based on new information arising after designated opportunities.

Objections for this project, including any attachments or supporting documentation, were accepted for 45 days beginning on the first day after the date of publication of the legal notice in the Duluth News Tribune Newspaper of Duluth, MN. The legal notice was published on November 17, 2015, and the 45-day objection period closed on January 4, 2016.

Over 22,500 individual objections were received throughout the filing period. Objections were compiled and sorted using the Comment Analysis and Response Application database by source, key objection issue, and date of receipt.

The Reviewing Officer convened an independent team of resource specialists to review the issues based on the prior specific written comments from the objection letters. The review team analyzed the issues along with the documentation in the project record including (but not limited to) the FEIS and the Draft Record of Decision (ROD). The Reviewing Officer written response was based upon review of the objections, the Project Record, and the recommendations of the review team.

A final decision, in this case a ROD, may not be signed until the Reviewing Officer has responded in writing to all pending objections (36 CFR 218.12 (a)) and until all instructions identified by the Reviewing Officer in the objection response have been addressed by the Responsible Official (36 CFR 218.12 (b)).

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The Reviewing Officer issued a letter responding to all objections on July 11, 2016. This letter included instructions the Responsible Official needed to address prior to signing a Final ROD. These instructions are addressed in detail in this appendix and informs discussions throughout the Final ROD that relate to the Reviewing Officer's instructions.

C.2 Objections Reviewing Officer Instructions and How Responsible Official Addressed Each Instruction

The following are the seven instructions identified by the Reviewing Officer and how the Responsible Official addressed each instruction.

C.2.1 Instruction on Project Record on TES (Threatened and Endangered Species) and RFSS (Regional Forester Sensitive species)

Review sections of the Project Record on Threatened and Endangered Species and Regional Forester Sensitive Species, which includes both plants and animals and make the following adjustments as needed:

a) reconcile differences between the FEIS and the Biological Evaluation
b) provide context for the project's impacts on the species
c) clarify and/or provide the appropriate scale of the analysis.

Addressing the Instruction -

a) reconcile differences between the FEIS and the Biological Evaluation

The NorthMet Biological Evaluation (BE) and the NorthMet Final Environmental Impact Statement (FEIS) (Section 4.2.4.2.3, also Section 5.2.4.2.1 and Section 5.3.4.2.3) both describe existing conditions for floating marsh marigold (*Caltha natans*) in the project area. However, each analysis describes a different number of populations of floating marsh marigold within what is the same project area. The reason for the difference is that the documents use the term "population" differently. Both documents initially state that "Populations correspond to the MDNR Element Occurrence…" and that "clusters" are colonies of individual plants within a population. The FEIS continues to use this definition in the analysis to describe the one population in the project area. The BE changes terminology and begins to interchange the term "population" for the word "cluster". The three so-called "populations" described in the project area in the BE would be properly called clusters if the usage of the terms remained consistent. Considering the single definition for "population" presented in the documents, it is most accurate to say that there is one population in the project area and 13 clusters or colonies. Further, the FEIS correctly states that there are 15 populations statewide versus the BE which states there are 12 populations statewide. For all the other RFSS plant species, the FEIS is more consistent and precise in its language regarding the term "population".

Although the BE is confusing in its usage of terms, the effects determination of "may impact individuals but no trend to federal listing" remains accurate.

Addressing the Instruction -

b) provide context for the project's impacts on the species
c) clarify and/or provide the appropriate scale of the analysis.

Plants

As described in the BE, the appropriate scale for the RFSS plants analysis is the local population viewed in a larger context. The direct and indirect effects happen locally at the scale of the project. For example,

the BE describes how one population of pale moonwort would be lost from federal ownership and impacted by mine development under the Proposed Action – this is a local effect. The BE also describes how much pale moonwort habitat would be gained under the Land Exchange Proposed Action – this is also a local effect. The larger context for these local effects are then described in the BE by comparing the number of populations impacted by the land exchange to the number of populations statewide, to provide context for the impacts. Assessing the local impacts in a larger context is an appropriate technique because it allows conclusions to be drawn about the scale and magnitude of the local impacts.

For Superior National Forest BE's, the "planning area" (generally equivalent to the forest boundary) is typically the larger context against which the local impacts are compared because National Forests have been required to maintain the viability of all species within the planning area. In some instances the NorthMet Project BE used the state of Minnesota as the larger context which can be a less appropriate choice.

APPC Table 1 below addresses the RFSS plants known to be on the Federal lands in the planning area using the Superior National Forest boundary as the larger context.

APPC Table 1. Land Exchange Impacts to RFSS Plants Relative to Superior National Forest Planning Area

Common name *Scientific name*	Number of populations impacted by Land Exchange*	Number of populations on Superior National Forest	Percentage of Forestwide populations impacted by Land Exchange
Michigan moonwort *Botrychium michiganense (hesperium)*	1	13	8%
Pale moonwort *Botrychium pallidum*	1	18	6%
Ternate grape-fern *Botrychium rugulosum (=ternatum)*	1	13	8%
Least moonwort *Botrychium simplex*	3	42	7%
Floating marsh-marigold *Caltha natans*	1	9	11%
Neat spike-rush *Eleocharis nitida*	1	37	3%
Moor rush *Juncus stygius*	0	24	0
Snowline wintergreen *Pyrola minor*	0	49	0
*FEIS population numbers are more accurate and are used here			

Wildlife

Four wildlife species with known occurrences at the mine site are identified in the BE that could be directly impacted by the NorthMet project Proposed Action. These species are northern

goshawk, great gray owl, bald eagle and three-toed woodpecker. With plant species direct impact to populations is relatively easier to quantify, with known number of locations, than for bird species which can be difficult to determine an actual number of individuals in an area. However, for some species, we have monitoring estimates of number of nests/territories across the Superior National Forest and statewide.

There are no known eagle nests in the mine site project area so there will be no loss of a known nest. See BE section 5.2.6.1.

There are no known three-toed woodpecker nests in the mine site project area so there will be no loss of a known nest. See BE section 5.2.6.5.

There are two known historic goshawk territories in the mine site project area. The 100-mile Swamp territory has not been used by goshawks since 2005 and is no longer considered an active territory (used in the last 5 years) by the MNDNR. The Wetlegs Creek territory is considered active and is still being monitored.

To put this possible loss of one active and one not active goshawk territory into a Forest-wide and Regional context it will be compared with the number of known territories on the Superior National Forest and known territories statewide (2014 data). See Table APPC Table 2.

APPC Table 2. Known Historic Goshawk Territories

	Total Territories	Active Territories	Not Active Territories
Superior National Forest	48	32	16
Statewide	147	71	71

Great gray owl nest monitoring has not been compiled into a single database. The Natural Heritage Database does not reflect all known occurrences. There is one known nest tree in the mine site project area that was used by great gray owls in the past. It was a nest originally used by a goshawk in the 100-mile swamp territory. This nest tree will be impacted. APPC Table 3 puts the loss of this one nest tree into a District-wide, Forest-wide and state-wide context.

APPC Table 3. Great Gray Owl Nest Trees

	Natural Heritage Database	Laurentian District Records
Superior National Forest	3	7*
Statewide	9	NA
*two of these are in the Natural Heritage database		

Currently between these two databases there are 14 distinct nest trees known to have been used by great gray owls. This number is likely greatly under-representative of actual occurrence because there has not been a push to track great gray owl nests in the Natural Heritage database.

Many other known nests are tracked locally, but not included in the database, and some known nests have not been tracked at all. These data is are not easily compiled.

C.2.2 Instruction on Review Effects on Wildlife Corridors, TES, RFSS, & Species of Concern

Review the appropriate sections of the Project Record on the effects on wildlife, wildlife corridors, Threatened and Endangered Species, Regional Forester Sensitive Species, and other species of concern that the proposed land exchange will cause and clarify the effects and context of the land exchange on these wildlife resources. The tradeoffs involved with exchanging and acquiring land should be made clear. Finally, examine the wildlife corridor analysis and clarify as needed to improve the context description.

Addressing the Instruction -

Tradeoffs - TES, RFSS, and Species of Concern

APPC Tables 1, 2 and 3 above provide context of the potential effects from the NorthMet Project Proposed Action on plants and wildlife.

APPC Table 1 indicates that three clusters of floating marsh marigold would be directly affected by either a mine stockpile or road development (FEIS Section 5.2.4.2.1); the 10 remaining clusters in this population would be unaffected by either the mine or land exchange. Of the other 9 populations on the Superior National Forest (all in St. Louis County), at least three populations have multiple colonies and one has thousands of plants (according to the rare features data provided by DNR and cited in the FEIS and BE). Even with the impacts caused by mine construction and land exchange, there are no plausible concerns for the viability of floating marsh marigold due to this project. (Note: Since the rare feature data were assessed for the FEIS and BE analysis, one additional floating marsh marigold population has been found on the Superior National Forest for a total of 16 known populations).

Even when the Land Exchange is viewed within the context of the Superior National Forest boundary, the effects determinations do not change. Despite impacts that affect between 0-11% of these 8 RFSS plant populations on the Superior (see APPC Table 1), there are still adequate remaining populations to maintain the viability of each species on the Superior National Forest and prevent a trend toward listing. Five of the species (the four *Botrychium* species and neat spike rush) are often found in areas that have experienced past disturbance (this is well documented in the DNR Rare Feature Database cited in the BE). As noted in the BE, they may also colonize areas disturbed by mining activities. Furthermore, the BE (Section 5.1.4.2) describes the 2,500 acres of habitat suitable for the four RFSS *Botrychium* species that would be acquired through the Land Exchange. For these reasons there are no concerns for the viability of these species.

For snowline wintergreen and moor rush, one population of each species would leave federal ownership. However, as documented in the BE, there would be no mine impacts or threats to these species from the NorthMet Project Proposed Action and the populations would continue to

exist. Having one population leave federal ownership would still leave adequate populations to maintain the species viability within the Superior National Forest (APPC Table 1).

There would be no loss of any known nests for bald eagle or three-toed woodpecker.

The northern goshawk territories shown in APPC Table 2 on northern goshawk territories identify the possible loss of one (3%) active (1 of 32 active territories on the Forest and one (4%) non-active goshawk territory (2 of 48 of all territories on the Forest) in the mine site project area. The determination in the BE is still correct. See 5.2.6.2 in the BE.

The Natural Heritage database and the Laurentian District database records shown in APPC Table 3 identify 1 of 14 (7%) known great gray owl nest trees in the state will be lost. As discussed above, the databases greatly under reports the number of known great gray owl nests in the Forest and in the State. Also, great gray owls do not have strong site fidelity and rarely return and use the same nest tree as used previously unlike goshawks which at least return to the same territory to nest year after year. For these reasons the determination in the BE is still correct. Please see 5.2.6.4 in the BE.

Concerns about effects on moose came up throughout the analysis process as a species of concern. Moose is a species of concern important to the public interest factor relating to wildlife habitat. Information regarding moose and potential effects is found in Chapters 4-5 and the species is discussed as important prey for the gray wolf in the Biological Assessment. FEIS Sections 4.2.5.1.1, 4.5.4.3, 5.2.5.2.1/2, 5.3.5, and 5.3.5.2.2 discuss the effects to moose. Both Chapter 5 and the Biological Assessment/Evaluation (FEIS Appendix D) present the effects to moose habitat from the land exchange proposed action or as a prey species for gray wolf. Effects to moose are summarized in Final ROD Table 2.

Wildlife Corridors

The FEIS discusses effects to wildlife corridors under section 6.2.5.4.2 Wildlife Travel Corridors. This section is summarized in Final ROD Table 2. The FEIS identifies effects from the NorthMet Project Proposed Action on two of 18 (11%) mapped wildlife corridors:

> "Of the 13 large mammal wildlife crossing corridors identified by Emmons & Olivier, two are in the vicinity of the Mine Site or Plant Site. The first is located approximately 1 mile southeast of the existing Plant Site (see Figure 6.2.5-1). Though small, this corridor has been identified as important (Emmons and Olivier 2006) and of moderate quality (Barr 2009a). The existing LTVSMC Tailings Basin is located within the corridor, but does not obstruct the entire width of it. The Tailings Basin provides poor habitat and is not likely to be heavily used by wildlife. Because current use is already limited, increased activity at the Tailings Basin is not likely to adversely affect wildlife movement through the corridor.
>
> The second corridor is located approximately 0.5 mile northwest of the Mine Site. It has been identified as important (Emmons and Olivier 2006) and contains high quality habitat (Barr 2009a). Operations at the Mine Site would indirectly affect

the corridor by reducing its size and acting as a source of noise and activity near the large habitat block southeast of the corridor. Though the Transportation and Utility Corridor is outside the wildlife corridors identified by Emmons & Olivier, it runs parallel and perpendicular to the corridors and would potentially affect wildlife use." (FEIS, p.6-77).

No other projects were identified that would add to the cumulative effects on these two corridors. Corridor 16 is expected to only have minimal impacts from the NorthMet Project Proposed Action. Corridor 17 is expected to have some direct loss of function from noise and activity but no actual loss of habitat. Since there will be very limited direct habitat impacts to one corridor and only noise and activity impacts on the other, quantify the impacts are difficult to quantify. The FEIS further addresses potential noise impacts in section 5.2.8.

Since reclamation is expected to begin in year 20, the time span of the effects to the corridors would be 20 years. Cessation of mining activities and the reclamation should restore most wildlife movement through these corridors after 20 years.

C.2.3 Instruction on Sulfide/Sulfate Abatement and MPCA/MNDNR Monitoring Role

Provide a synopsis of the sulfide abatement program and the critical role the MDNR permit monitoring plays in the long-term protection of wild rice beds downstream of the project area.

Addressing the Instruction -

Clarifications:

1) *Sulfide vs Sulfate:* The sulfate abatement program is the surrogate for sulfide management. The difference between sulfate and sulfide is best described by the Minnesota Pollution Control Agency (Minnesota Pollution Control Agency, March 24, 2015) as follows:

Sulfate always refers to sulfate in surface water, which can diffuse into sediment and be converted to sulfide by bacteria.

Sulfide always refers to sulfide in porewater (with the minor exception of acid-volatile sulfide, or AVS, which is mentioned once in this report). Sulfide refers to the sum of several different forms that vary according to pH: Below pH 7.0 hydrogen sulfide (H2S) is dominant, and above pH 7.0 bisulfide (HS-) is dominant. It is thought that hydrogen sulfide is the more toxic form.

Two forms of iron in the sediment of wild rice waters are discussed in addressing these instructions: iron in the porewater of sediment (which is always called porewater iron) and sediment iron. Sediment iron, which includes porewater iron, is the iron that is thought to potentially interact with sulfide (it is the iron that goes into solution when a sediment sample is extracted with 0.5 N hydrochloric acid for half an hour at 80 degrees C). Porewater iron is a very small proportion—less than 3%—of extractable iron, which is the main reservoir of iron that can interact with sulfide.

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2) *Minnesota Department of Natural Resources (MDNR) vs Minnesota Pollution Control Agency (MPCA):* Both of these state agencies have an important role in the management of water resources. In simplistic terms, the
   - MDNR is responsible for the water quantity, physical lakebed/streambed or wetland, and the biota and
   - MPCA is responsible for the water quality related to specified uses.

Project Sulfate "Abatement Program" Engineering Elements

A synopsis of the engineering controls to manage water quantity and quality are summarized in Section 3.2.2.1.8 of the FEIS and includes:

- Installation of engineered cover over
  - Category 1 stockpile
  - Tailings basin at closure
- Installation of liners
  - Category 2/3 and 4 stockpiles during operation
  - Ore Surge Pile during operation
- Installation of hydraulic barrier trench / cutoff wall
  - Category 1 stockpile
  - Tailings basin
- Installation of rim dike and ditch system to collect surface runoff at the mine site
- Subaqueous disposal of type 2/3 and 4 waste rock as part of site reclamation
- Overburden storage area and laydown area runoff pumped to flotation tailings basin
- Treatment of 'contact water' at the mine site and reject concentrate from the plant site
  - wastewater treatment plant (WWTP - reverse osmosis) at the plant site during operation and as long as treatment needed
  - wastewater treatment facility (WWTF- chemical precipitation and filtration) during operation and during closure to treat category 2/3 and 4 waste rock stockpiles, Ore Surge Pile, ancillary mine features, and mine pits
  - conversion of wastewater treatment facility (WWTF) to a reverse osmosis for long-term closure

Role of State Permitting and Monitoring

Numerous permits are required for the project as described in more detail in Section 1.4.4 of the FEIS. Permits specifically related to regulating water quality related to wild rice are summarized below.

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Minnesota Department of Natural Resources (MDNR) Appropriation Permit:

One of the needed permits that regulate water resources for the project is the Water Appropriation Permit from the MDNR. PolyMet has applied for five Individual Non-Irrigation Water Appropriation Permits from the MDNR (Barr Engineering Inc., 2016). The Water Appropriation Permit does not directly regulate water *quality;* however, it does regulate water flow and use.

The permit application includes monitoring wells at the mine site in the surficial unconsolidated material and bedrock. The permit will require information from these monitoring wells and pumping records to be submitted to the MDNR as part of an annual report. The data will be available to the public upon request. These wells are installed to determine the direction of groundwater flow from the mine pit(s). Interagency Technical Memorandum dated October 12, 2015 (listed in the FEIS as reference "MDNR, 2015c") states:

> *"Existing monitoring data, combined with future robust monitoring and contingency mitigation, will ensure that any potential northward bedrock groundwater flow from the proposed NorthMet pits to the Northshore pits would be preemptively addressed and prevented……Contingency mitigation measures are technically feasible options that could be undertaken should northward flow be determined likely between the proposed NorthMet pits and Northshore pits… the original need for and performance of mitigation measure(s) are continually reassessed to ensure they are appropriate over the course of the project. If contingency mitigation is not producing a desired outcome, then mitigation can be added, or the design of the existing mitigation can be changed, until the desired outcome is achieved.."*

The wells will be installed to meet the conditions of the MDNR Water Appropriation Permit. Hence, the MDNR, in coordination with MPCA, will determine at (if) permit issuance and through the life of the permit:

a) whether the data provided by the monitoring efforts is sufficient

b) if additional wells / information is needed,

c) if mitigation is needed, and

d) whether mitigation is working or needs to be modified.

Minnesota Department of Natural Resources (MDNR) Permit to Mine:

PolyMet will also have to obtain a Permit to Mine from the MnDNR. The purpose of this permit is cited by the MnDNR as:

> *"The purpose of the Permit to Mine is to control the possible adverse environmental effects of mining by ensuring orderly construction and development of a mine, sound operational practices, and progressive reclamation of mined areas. This permit ensures that a mine is developed in a manner that facilitates future land uses. The Permit to Mine also includes provisions that govern wetland impacts and mitigation, and it is the key permit for setting financial assurance requirements for a mine. Financial assurance is required to provide adequate funding that the DNR could access in the event that a company abandons a project, fails to properly maintain or*

> *reclaim the site, or fails to correct noncompliance."* (Minnesota Department of Natural Resources, 2016)

An application for the Permit to Mine has not been submitted as of writing of the NorthMet Project Land Exchange Final ROD. As noted above, one of the purposes of the permit is to control adverse environmental effects during operation and after reclamation. This purpose includes the control effects related to drainage patterns and discharges associated with downstream wild rice resources. Hence the MDNR has the authority through the Permit to Mine to require control of adverse environmental effects on downstream wild rice resources.

MPCA National Pollution Discharge Elimination System and State Disposal System (NPDES/SDS) Permit:

The current water quality standard for sulfate in wild rice surface waters is 10 mg/l. The MPCA is presently considering a revised standard to consider organic carbon and iron in the water (Minnesota Pollution Control Agency, 2016) (Minnesota Pollution Control Agency, July 18, 2016). However, it will likely be nearly a year (or possibly longer) before there is a final decision on whether a change in the sulfate standard is warranted and what the new standard will be.

In the 2015 session, the Minnesota Legislature passed legislation (2015 Special Session 1, Chapter 4--S.F.No. 5, Sec 136) that, in part, addresses the application of the current wild rice sulfate standard in water quality permits. This legislation reads:

Sec. 136. WILD RICE WATER QUALITY STANDARDS.

(a) Until the commissioner of the Pollution Control Agency amends rules refining the wild rice water quality standard in Minnesota Rules, part 7050.0224, subpart 2, to consider all independent research and publicly funded research and to include criteria for identifying waters and a list of waters subject to the standard, implementation of the wild rice water quality standard in Minnesota Rules, part 7050.0224, subpart 2, shall be limited to the following, ***unless the permittee requests additional conditions*** *(emphasis added):*

(1) when issuing, modifying, or renewing national pollutant discharge elimination system (NPDES) or state disposal system (SDS) permits, the agency shall endeavor to protect wild rice, and in doing so shall be limited by the following conditions:

(i) the agency shall not require permittees to expend money for design or implementation of sulfate treatment technologies or other forms of sulfate mitigation; and

(ii) the agency may require sulfate minimization plans in permits; (2) the agency shall not list waters containing natural beds of wild rice as impaired for sulfate under section 303(d) of the federal Clean Water Act, United States Code, title 33, section 1313, until the rulemaking described in this paragraph takes effect.

(b) Upon the rule described in paragraph (a) taking effect, the agency may reopen permits issued or reissued after the effective date of this section as needed to include numeric permit limits based on the wild rice water quality standard.

(c) The commissioner shall complete the rulemaking described in paragraph (a) by January 15, 2018.

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Part (a) of the legislation limits implementation of the current 10 mg/l wild rice sulfate standard in water quality permits but with a provision that a permittee may request that 'additional conditions' be applied to its permit. PolyMet has used this provision of the legislation for its NorthMet project. As a result, the FEIS impact analyses assumed a discharge from the wastewater treatment plant that met 10 mg/L sulfate. Consistent with this, PolyMet's NPDES/SDS permit application for the project includes a commitment to install treatment technology capable of meeting 10 mg/L sulfate. An NPDES/SDS permit decision on this project does not depend upon completion of any revisions to the wild rice standard.

As alluded to above, PolyMet has applied for an NPDES/SDS permit from the MPCA in seven volumes as summarized below:

1) Volume 1 – Introduction (Barr Engineering, Inc., July 2016a)
2) Volume 2 – Mine Site (Barr Engineering, Inc., July 2016b)
3) Volume 3 – Waste Water Treatment System (Barr Engineering, Inc., July 2016c)
4) Volume 4 – Plant Site Sewage Treatment and Stormwater (Barr Engineering, Inc., July 2016d)
5) Volume 5 – Tailings Basin and Beneficiation Plant (Barr Engineering, Inc., July 2016e)
6) Volume 6 – HRF and Hydrometallurgical Plant (Barr Engineering, Inc., July 2016f)
7) Volume 7- Transportation and Utility Corridors (Barr Engineering, Inc., July 2016g)

Several sections of the FEIS (such as Sections 1.4.4, 3.2.2, 5.2.2, Appendix A.5.24) indicate monitoring wells and surface monitoring will be utilized. These proposed monitoring locations have been included in the permit application(s) noted above. They will be used to check for project compliance (e.g., water quality at the point of discharge from the treatment facility or groundwater quality at the property boundary), indicator monitoring (e.g., groundwater quality within the footprint of the facility or downstream surface water monitoring), monitoring of internal waste streams associated with specific project features (to detect potential impacts), and to monitor performance of engineering infrastructure such as liner leakage and seepage collection systems. Information from these monitoring locations will be submitted to the MPCA in standard monthly Discharge Monitoring Reports as well as in various special reports that will be required by the NPDES/SDS Permit. The MPCA will evaluate the data to ensure compliance with permit conditions including those related to the 10mg/l sulfate standard for wild rice in wild rice waters. The monitoring data will be available to the public upon request.

The monitoring wells will be installed to meet the conditions of a future MPCA NPDES/SDS Permit if granted. Hence, the MPCA, in coordination with MDNR, will determine at (if) permit issuance and through the permit life:

a) whether the data provided by the monitoring efforts is sufficient
b) if additional wells / monitoring sites / information are needed,

c) if mitigation is needed, and

d) whether mitigation is working or needs to be modified.

NPDES/SDS permits are issued for a maximum period of five years and any permit issued for the NorthMet project will need to be reissued several times during the life of the project. As part of each reissuance process MPCA will review, evaluate, and consider the monitoring data accumulated from the previous issuances of the permit.

Summary of adaptive management plan at the plant site

The adaptive management plans are well-defined and identified in various sections of the FEIS, including the following sections:

FEIS Section 3.1.1.7

"Actual treatment requirements would be assessed on a recurring basis throughout operations, reclamation, and closure considering influent and effluent water quality and monitoring results. Those periodic assessments would be carried out to ensure continuous protection of groundwater and surface water quality and compliance with water quality-based effluent limits. The periodic assessment process would rely on monitoring results coupled with predictive modeling rather than the results of the predictive modeling alone. Regardless of the precise duration of effects or water treatment at either the Mine Site or Plant Site, there are measures available to address impacts to natural resources, such as those identified in the Adaptive Water Management Plan (PolyMet 2015d) and those developed permit conditions. PolyMet would be held accountable for maintenance and monitoring required under the permit and would not be released from financial assurance until all permit conditions have been met. PolyMet would be required to provide financial assurance to MDNR (managed independently) for closure and maintenance costs as a contingency if PolyMet or the operating company at that time were unable to fulfill the obligations under the Permit to Mine."

From FEIS Reference PolyMet 2015D
(NorthMet Project Adaptive Water Management Plan)

CATEGORY 1 Waste Water Treatment Plant (WWTP):

4.2.4 Adaptive Management

To meet the specific treatment targets for each of the Project phases, the operating configuration and the operating requirements of individual process units within the WWTP or the capacity of the WWTP will need to be modified. Thus, the WWTP is considered an adaptive engineering control. The WWTP treatment processes can be adapted, as necessary, in response to the actual conditions encountered during the Project, the monitoring results, and the conditions estimated by continued model updating.

4.2.4.1 Reporting and Model Update

The Project includes a comprehensive water quality and quantity monitoring and reporting program that will be finalized in NPDES/SDS permitting (Section 5 of Reference (2)). The

program includes annual comparison of actual monitoring to modeled results for the WWTP. This comparison will be used to refine the model. See Section 6 of Reference (2) for details.

4.2.4.2 Circumstances Triggering Modification

Circumstances that could trigger the need for one or more modifications to the WWTP operating configuration include:

- *variation in influent water quantity which could result in the need for more or less treatment system capacity*
- *variation of the influent water quality from the modeled water quality which could result in a change in the operating performance of one or more of the treatment processes*

4.2.4.3 Options for Modified Performance

Variations of either influent water quantity or quality can be addressed within the overall concept for the design, construction, and operation of the WWTP. Because the plan for construction of the WWTP envisions a phased build-out of the capacity that will be needed when the maximum flow occurs, variations in quantity can easily be addressed by either accelerating or delaying the installation of the additional equipment that is planned for the expansion of the WWTP. Treatment performance issues that could occur from changes in influent water quality can be addressed by making adjustments to operating conditions.

In addition to operational changes, the treatment systems could also be modified to improve performance, if necessary. All modifications to the operation of the WWTP would be completed in accordance with the applicable NPDES permit requirements, including review and approval of any treatment system modifications by the MPCA, if necessary. Examples of how the WWTP can be adapted during the Project to modify treatment performance include:

- *use of alternative membranes for either the primary or secondary membrane separation process units to modify the removal efficiencies of selected parameters across these systems*
- *treatment system modifications to improve metals removal (including mercury) (Section 4.2.4.3.1)*
- *softening pretreatment (Section 4.2.4.3.2)*

4.2.4.3.1 Modifications to improve metals removal

If removal rates for metals (including mercury) are less than projected, several treatment system modifications are possible to improve performance and achieve water resource objectives:

- *pretreatment modifications such as addition of a chemical scavenger ahead of the greensand filter units to obtain additional metals removal*

- *addition of polishing treatment units for removal of trace metals (e.g., ion exchange) from the primary membrane permeate*

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CATEGORY 1 FLOTATION TAILINGS BASIN (FTB):

5.4 Adaptive Management

5.4.1 Test Projects

A field demonstration project will be conducted in conjunction with construction of the bentonite layer to confirm that the construction methodology will achieve the required reduction in percolation. This demonstration project will be developed based on the state of practice existing when the pond bottom cover system is to be implemented. Prior to implementation of the demonstration project, a demonstration project plan will be submitted to the MDNR for review and approval. In addition to providing a description of the demonstration project approach, the plan will include criteria and methods for evaluating demonstration project outcomes.

5.4.2 Reporting and Model Update

The Project includes a comprehensive water quality and quantity monitoring and reporting program that will be finalized in NPDES/SDS permitting. The program includes performance monitoring for the FTB seepage capture systems (quantity and quality of the water collected by the seepage capture systems), which will provide an indication of cover system performance. See Section 5 of Reference (7)) for details. The program includes annual comparison of actual monitoring to modeled results for the water collected by the seepage capture systems, the tributaries and PM-13. This comparison will be used to refine the model. See Section 6 of Reference (2) for details.

5.4.3 Modified Design

If the monitored quantity or quality of water collected by the seepage capture systems, or annual updates to the model indicate that modifications are needed to meet water resource objectives, modifications could be made to the pond bottom cover system, the FTB Containment System, or the WWTP. This section describes potential adaptive management actions for the FTB Pond Bottom Cover System. Potential adaptive management actions for the FTB Containment System are described in Section 2.1.3.2 of Reference (6), and potential adaptive management aspects of the WWTP are described in Section 4.2.4. Additional potential adaptive management actions for water quality at the Plant Site are described in Sections 6.5 and 6.6 of Reference (2).
The pond bottom cover design can be modified up to the point of installation. The current version of this document will determine the design to be implemented. After installation, post installation adjustments can be made.

5.4.3.1 Circumstances Triggering Modification

Circumstances that could trigger a request for design modification approval include:

- *New construction materials or techniques are developed that would achieve the required limits on percolation.*
- *Field monitoring confirms that the actual percolation rate differs from that planned. Actual percolation could differ from plan for various reasons:*
  - *Average pond depth differs from plan.*
  - *Actual performance of the bentonite amendment differs from plan.*
- *Field monitoring and model updating demonstrate that the required limits on percolation have changed and that a modified design can achieve that performance. The required amount could change for various reasons:*

- *Modeled performance of other adaptive engineering controls (FTB Containment System or WWTP) could change.*
- *Modeled constituent load from FTB could change.*

5.4.3.2 Options for Modified Performance

Prior to installation, the design of the pond bottom cover system can be adjusted to modify performance if approved by MPCA and MDNR. Options include:

- *increased or decreased thickness of the bentonite amendment (decreases/increases flow [Q] by decreasing/increasing hydraulic conductivity [K] in Equation 5-1)*
- *increased percent of bentonite (decreases Q by decreasing K in Equation 5-1)*
- *combination of increased/decreased thickness and increased/decreased percent bentonite*

After installation, the design of the installed pond bottom cover system can be adjusted to modify performance if approved by MPCA and MDNR. Modified performance after installation can be achieved by the same methods listed for initial installation, and/or:

- *the bentonite amended layer could be excavated from portions of the pond bottom*

NON-MECHANICAL TREATMENT:

6.1.5 Adaptive Management

The Non-mechanical treatment systems are adaptive engineering controls because they will be designed and operated based on site-specific conditions using the knowledge that is gained during the operating and reclamation phases of the Project. The specific adaptive management approach for each non-mechanical system is outlined in the development plans (Sections 6.2.3, 6.3.3, and 6.4.3).

From FEIS Reference PolyMet 2015i (Water Management Plan – Plant)

6.5 Adaptive Management

There are adaptive management actions that could be implemented if there is an exceedance of a surface or groundwater standard detected as part of water quality monitoring or if the water model projects a future exceedance of surface or groundwater standards given observed conditions. In general the steps will be:

1. *Initiate any field studies that may be necessary to determine the root cause of the exceedance.*
2. *Once the root cause is identified, implement any adjustments that can be made to the adaptive engineering controls described in Reference (5) that will remedy the root cause. Adjustments to the adaptive engineering controls include changing the scale or type of control and/or its design.*
3. *If the exceedances persist, implement contingency mitigation (Section 6.6) that will remedy the root cause and include that contingency mitigation as an adaptive engineering control in Reference (5).*

4. *Monitor and model effects to the environment with new or adjusted engineering control. If issue persists begin Step 1 again.*

6.6 Contingency Mitigation

If monitoring or the refined model estimates show that with adaptive engineering controls water quantity or quality at compliance points is projected to not meet compliance parameters, mitigations are available that would address those situations. The contingency mitigations described in the following paragraphs are feasible but depend on site-specific conditions and do not include modifications to adaptive engineering controls that are described in Reference (5). These mitigations would be developed and designed if needed and coordinated with the MDNR and MPCA as appropriate.

A. New surface seepage locations emerge as the FTB is developed.

i. The FTB Containment System or the FTB South Seepage Management System described in Sections 2.1.3 and 2.1.4 can be expanded to collect seepage from any new seepage locations.

B. FTB pond water quality is worse than expected.

i. Additional treatment at the Mine Site WWTF could be used to reduce solute load delivered to the FTB Pond.

ii. Water from the FTB seepage capture systems that is returned to the FTB Pond is not currently planned to be treated. The collected seepage, or some portion of it, could be sent to the WWTP for treatment before being returned to the FTB Pond.

iii. Pond water could be sent to the WWTP for treatment and returned to the FTB Pond.

iv. The FTB Pond could be treated in-situ with iron salts, fertilizer, or other methods tailored to the constituent of concern. For example, certain pit lake remediation technologies have successfully treated billion gallon pit lakes for contaminants including selenium, zinc, uranium, and nitrate. These technologies have been successfully applied at numerous sites and locations and have demonstrated successful remediation.

C. Groundwater or surface water downgradient of the FTB has compliance issues.

i. The containment system around the FTB could be inspected for breaches and repaired or interception wells could collect groundwater flows impacted by a breach.

ii. FTB Pond water quality could be improved by implementing mitigations described in B above.

iii. Interception wells could collect groundwater flows impacted by a leak from the FTB Containment System. Several of the potential mitigation options discussed above include additional treatment of water at the WWTP. The WWTP is, by design, adaptive, as described in Section 4.2 of Reference (5). The WWTP treatment capacity can be expanded by adding additional parallel treatment trains to accommodate additional flow.

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How water quality standards would be met with treatment studies, adaptive management triggers, and adaptive treatment measures

Water quality standards will be met through the administration of the MnDNR and MPCA permits for the project. These permits authorize the State of Minnesota to require additional studies, determine specific management triggers, and implement adaptive treatment measures needed to ensure water quality standards are met. The above material provides information about the currently identified adaptive management triggers and measures.

Routing of Colby Lake water and ability to meet mercury effluent standard

See FEIS Section 3.2.2.3.4

> ***"Plant Process Water***
> *Water needed for the milling and flotation circuits would primarily be return water from the Tailings Basin, which would include treated Mine Site process water. As a contingency measure, any shortfall in water requirements would be made up by raw water from Colby Lake as necessary using an existing pump station and pipeline. Throughout operations, the average annual makeup water drawn from Colby Lake would vary between 260 and 1,760 gallons per minute (gpm), with an average annual demand of 760 gpm. This would be the total potential raw water demand from both the Beneficiation Plant and the Hydrometallurgical Plant."*

See also FEIS Figure 5.2.2-12. Note that there is no direct discharge of Colby Lake water from the proposed project; and the only indirect discharge of Colby Lake water that has not been treated through the WWTP is any potential bypass flow of the seepage containment system at the Flotation Tailings Basin (however, this indirect discharge would still have the benefit of the demonstrated mercury removal afforded by contact with the tailings, as described elsewhere in the FEIS). This potential leakage will be monitored and the containment system modified as needed through the MnDNR and MPCA permit programs. The adaptive management for the containment system are referenced above in this appendix.

C.2.4 Instruction on Potential New Information on Ecosystem Services

Address the June 2015 report "The Value of Nature's Benefits in the St. Louis River Watershed" for purposes informing the analysis and the public interest determination. In the event that this report could contain new information that should be considered, address the report to the extent it is applicable to the proposed land exchange.

Addressing the Instruction -

NorthMet Project Land Exchange: Ecosystem Services

Pursuant to 36 CFR 254.3(b) (Final ROD, **Public Interest Determination**), to make a decision on a land exchange the Forest Service must give full consideration to public interest factors.

Final ROD Table 2 identifies the public interest factors that must be given full consideration for the land exchange proposed action.

The Public Interest Determination and Findings cover a wide array of ecosystem services, defined as:

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> "Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth. (Millennium Ecosystem Assessment, 2005):"

'The Value of Nature's Benefits in the St. Louis River Watershed', a study commissioned by the Fond du Lac Band of Lake Superior Chippewa, provides a valuation of the economic benefits of ecosystem goods and services provided by the St. Louis Watershed. The study adapts The Millennium Ecosystem Assessment's classification of ecosystem services into 5 categories:

- Provisioning services: Provides basic goods including food, water and materials
- Regulating services: Benefits obtained from natural control of ecosystem processes
- Supporting services: Provide refuge and reproduction habitat to wild plants and animals
- Information services: Provide humans meaningful interaction with nature
- Cultural services[1]: Provide humans with psychological, social and physiological health responses

APPC Table 4, below, categorizes the Final ROD public interest factors considered for the land exchange proposed action (see Final ROD Table 2) into the five categories of ecosystems goods and services described in 'The Value of Nature's Benefits in the St. Louis River Watershed' and use these as a framework for assessing the value of ecosystem services in the St. Louis River watershed. The public interest factors considered in the FEIS and Final ROD cover all five of the ecosystem services presented in the report.

[1] Many of the Cultural Services identified in 'The Value of Nature's Benefits in the St. Louis River Watershed' were not measured in the report. These services can be qualitatively measured, and are often incorporated in the 'Information Services' category. While the study did not explicitly measure these services, they have been included in the assessment of ecosystem services included in the NorthMet Public Interest Factors in the Final ROD and FEIS.

APPC Table 4: Ecosystem Services Considered for NorthMet Land Exchange Proposed Action						
FROD Public Interest Factors Considered For Land Exchange Proposed Action	FEIS Section Citation	Ecosystem Service Provided: Economic benefit to People				
		Provisioning	Regulating	Supporting	Information	Cultural
Protection of Fish and Wildlife Habitats	5.3.4/5.3.5/5.3.6/ 7.2.4	X	X	X		X
Cultural Resources	5.3.9/7.2.4				X	X
Watersheds	5.3.2/5.3.3/7.2.4	X	X	X		X
Wilderness and Special Designation Areas	5.3.12/7.2.4		X	X	X	X
Aesthetic Values	5.3.11/7.2.4				X	X
Recreation Opportunities and Public Access	5.3.1/5.3.11/7.2.4				X	X
Expansion of Communities	5.3.10	X				
Promotion of Multiple-Use Values		X			X	X
Implementation of Applicable Forest Land and Resource Management plans	1.0/3.3.3				X	

'The Value of Nature's Benefits in the St. Louis River Watershed' studied the whole St. Louis Basin. It would be difficult, if not impossible, to extrapolate information from the report to accurately characterize impacts to the subwatersheds. NEPA does not require cost-benefit analysis. Non-monetary values and ecosystems services are briefly discussed in the socioeconomics sections of the FEIS, including 5.2.10, 8.3, and Appendix A.

The following section describes how the public interest factors considered in the Final ROD and FEIS correspond to the five ecosystem services categories.

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Provisioning Services

Provisioning services are those ecosystem goods and supplies that provide basic goods including food, water, energy and raw materials as well as ornamental and medicinal resources (The Value of Nature's Benefits in the St. Louis River Watershed, page 15). Specially, the public interest factors considered that fall under provisioning ecosystem services include the protection of fish and wildlife habitats, watersheds, expansions of communities, and promotion of multiple-use values (See Final ROD Table 2). These factors contribute water, food and raw materials through habitats, watersheds, and increased positive economic effects from community expansion and multiple-use values.

Regulating Services

Regulating services are the benefits obtained from natural control of ecosystem processes, including biological control, climate stability, air quality, water regulation, pollination and soil formation, to name a few (The Value of Nature's Benefits in the St. Louis River Watershed, page 15). The public interest factors considered that fall under regulating ecosystem services include protection of fish and wildlife habitats, watersheds and wilderness and special designation areas (See Final ROD Table 2). These factors contribute biological and pest control, climate stability, soil formation, water regulation and pollination through wildlife habitats, stream bank stability and watersheds and protected wilderness areas.

Supporting Services

Supporting services provide refuge and reproduction habitat for wild plants and animals and include habitat, nurseries and genetic resources (The Value of Nature's Benefits in the St. Louis River Watershed, page 15). The public interest factors considered that fall under supporting ecosystem services include protection of fish and wildlife habitats, watersheds and wilderness and special designation areas (See Final ROD Table 2). These factors contribute habitat and biological diversity, the basis for most ecosystem functions, growth of commercially harvested species through wildlife habitat, watersheds and protected wilderness.

Information and Cultural Services

Information services provide humans meaningful interaction with nature through natural beauty, recreation and tourism, science and education, and spiritual and historic purposes (The Value of Nature's Benefits in the St. Louis River Watershed, page 15). Cultural services provide humans with psychological, social and physiological health responses (The Value of Nature's Benefits in the St. Louis River Watershed, page 17). These can include, but are not limited to: Aesthetic responses, cultural heritage and identity, spiritual value, intrinsic value, therapeutic value, recreation value and access to food, water and air.

All of the public interest factors fall under either the information or cultural ecosystem services categories (See Final ROD Table 2). They contribute the appreciation of enjoying natural beauty (sounds, scents, smells, and presence), experiencing nature and outdoor activities, using these systems for education, research and science, using nature for religious and spiritual purposes, providing outdoor recreation activities, availability of commonly harvested species, future

generations experiencing the outdoors, and the biological diversity values of fish, wildlife, plants and more.

C.2.5 Instruction on Avoid or Minimize Environmental harm

Include information stating that all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted. This information should also discuss the monitoring and enforcement program for any mitigation as appropriate.

Addressing the Instruction -

40 CFR 1505.2(c): requires that the record of decision in cases requiring environmental impact statements state whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. A monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation.

At page 13-14 (**Forest Plan Direction and Purpose and Need**) the Final ROD states:

> "While my draft decision is for the land exchange only, the future use on the conveyed land, the NorthMet Mining Project, meets the intent of Forest Plan Desired Condition D-MN-2. Based on the mining project design and mitigation as described throughout the FEIS, I believe that all practicable means to avoid and/or minimize environmental harm to remaining national forest lands that might occur from implementing the mining project are incorporated into the design and mitigations as to be implemented in the permitting process (40 CFR 1505.2(c)). Applicable law and regulations for the protection of the environment and human health will be met by the mining project (FEIS Section 1.4.4 and Table 1.4-1; FEIS Table 7.2.4-1)."

All practicable means to avoid of minimize environmental harm from the alternative selected have been adopted as required under 40 CFR 1505.2(c). Mitigation measures to avoid or minimize environmental harm are identified and incorporated in the analysis disclosed throughout the FEIS.

FEIS Section 3.2.2 NorthMet Project Proposed Action states that the NorthMet Project Proposed Action has been defined by PolyMet Project Description Version 9 (PolyMet 2015a) and includes design elements and mitigation measures identified in the management plans described within the section. These management plans contain mitigation measures that are part of the NorthMet Project Proposed Action and would be adjusted as appropriate during final design and permitting.

Monitoring efforts are incorporated into the NorthMet Proposed Action in the management plans identified in FEIS section 3.2.2. These plans include:

- Wetland Management Plan (PolyMet 2015c)

- Air Quality Management Plan – Mine (PolyMet 2014m)
- Air Quality Management Plan – Plant (PolyMet 2014n)
- Rock and Overburden Management Plan (PolyMet 2015h)
- Water Management Plan – Mine (PolyMet 2015r)
- Water Management Plan – Plant (PolyMet 2015i)
- Flotation Tailings Management Plan (PolyMet 2015n)
- Residue Management Plan (PolyMet 2014r)
- Reclamation Plan (PolyMet 2015g)

In addition, FEIS section 3.2.3.3.4 Refinement of the Proposed Action after the 2013 SDEIS identifies increasing the number of bedrock monitoring wells north of the Mine Site to monitor bedrock groundwater elevations and understand bedrock groundwater flow direction. FEIS Section 5.2.2.

How monitoring programs would be carried out and enforced will be further defined through the permitting processes PolyMet will need to complete prior to entering into development and mining operations. PolyMet must obtain the required federal, state, and local permits and approvals summarized in FEIS Table 1.4-1.

FEIS section 3.2.2.4 further identifies direction for PolyMet to provide financial assurance to ensure that appropriate and effective mitigation measures will be implemented. *Minnesota Rules*, part 6132.1200, require that before a Permit to Mine can be issued, financial assurance instruments covering the estimated cost of reclamation, should the mine be required to close for any reason at any time, must be submitted and approved by the MDNR. Financial assurance for the NorthMet Project Proposed Action could be required indefinitely and could include self-sustaining instruments.

The level of engineering design and planning required to calculate detailed financial assurance amounts is not currently available, but would be evaluated in detail during the permitting process. FEIS sections 3.2.2.4.1 Cost Coverage and Estimation, 3.2.2.4.2 Financial Assurance Instruments, and 3.2.2.4.3 Cessation of Financial Assurance outline the purpose and requirement of financial assurance, including the rules and criteria that would be used in determining financial assurance and the risk analysis involved, as well as how PolyMet would calculate financial assurance during the permitting process.

In the event that the monitoring (coupled with modeling) identifies the potential for any water quality exceedances, PolyMet has proposed an Adaptive Water Management Plan (AWMP) that identifies additional mitigation measures that could be taken, if necessary, to further protect water quality. See FEIS sections 5.2.2.3.5 and 5.2.2.3.6 Monitoring.

PolyMet has proposed or agreed to measures to avoid, minimize, or mitigate potential environmental effects. These measures are considered part of the NorthMet Project Proposed Action (see FEIS Section 3.2) and include design changes since the DEIS, including fixed engineering controls. PolyMet would be required by its permits to monitor water quality and quantity to refine modeling and to predict future conditions for consideration in permit renewals.

In the event that monitoring, coupled with modeling, identifies the potential for water quality exceedances, PolyMet has proposed adaptive engineering controls and contingency mitigation that could be implemented to prevent exceedances of water quality standards. PolyMet commits to monitoring and management through application of facility management plans listed in Section 3.2.2.

Monitoring is a critical component of the NorthMet Project Proposed Action to better understand impacts and to inform facility operation and maintenance and the selection and implementation of possible adaptive or contingency mitigation measures. The NorthMet Project Proposed Action includes PolyMet's proposed water quality and quantity monitoring plan.

C.2.6 Instruction on Completing NHPA Section 106 Process

Complete this consultation required under the National Historic Preservation Act (NHPA) Section 106 process and meet all the regulatory requirements of 36 CFR Part 800 prior to signing the ROD. The ROD should describe the outcome of the Section 106 process and document appropriate consideration of historic, tribal, and cultural resource issues.

Addressing the Instruction -

In addition to ongoing government to government tribal consultation on many projects across the Superior National Forest, the federal Co-lead Agencies have actively consulted with the federally recognized Bands that have expressed an interest in consulting on the NorthMet Mining Project and Land Exchange. This consultation is on historic properties pursuant to requirements of Section 106 of the National Historic Preservation Act. Historic properties affected by the NorthMet Mining Project Proposed Action have been identified and the impacts to those properties have been assessed. This also includes an assessment of actual use of those historic properties, as well as other resources in the area of potential effect, by tribal members. The consultation process under Section 106 is described in FEIS Section 4.2.9. A Memorandum of Agreement (MOA) has been completed and is part of the NorthMet Project Land Exchange project record. USFS and USACE (federal Co-lead agencies); Minnesota State Historic Preservation Office (MnHPO), and the Advisory Council on Historic Preservation (ACHP) have signed the MOA. PolyMet (project proponent) has signed the MOA as an invited signatory. The Fond du Lac and Grand Portage Bands of Lake Superior Chippewa and the Bois Forte Band of Chippewa have been invited to sign as concurring parties.

Historic properties that are adversely affected include Mesabe Widjiu (Laurentian Divide), Spring Mine Lake Sugarbush, Beaver Bay – Lake Vermillion Trail Segment, Erie Mining Company Concentrator Building, and Erie Mining Company Landscape Historic District.

There are adverse effects to these properties due to loss of sites and proximity to proposed activities. These effects will be mitigated through actions identified in the MOA developed for this project.

Effects on cultural resources and culturally significant natural resources are addressed in the Cultural Resources sections in FEIS Chapters 4, 5, and 6. The project record documents appropriate consideration of historic, tribal, and cultural resource issues and includes the MOA.

After the Draft ROD was issued in November 2015, the ACHP requested to participate in the development of the MOA on May 2, 2016. All of the consulting parties including ACHP, contributed to the development of the final MOA.

The USFS and USACE have signed the MOA along with MnHPO, ACHP, and PolyMet. As of the date of the Final ROD, the Bands have not signed the MOA. Since the Bands are participating as concurring signatories, they are not required to sign the MOA to fulfill requirements under section 106.

C.2.7 Instruction on Disclosure of Environmental Justice Issues

Provide a more concise and comprehensive disclosure of environmental justice issues in the ROD utilizing the Council on Environmental Quality's (CEQ) environmental justice guidelines. It is critical to acknowledge that neither E.O. 12898 nor the CEQ guidelines prescribe any specific format for examining environmental justice, but it is the responsibility of federal agencies to address environmental justice in a manner that is clear, concise, and comprehensible. The ROD should reference the CEQ guidelines and provide a clear explanation as to how each of the six general principles on pages 8-9 of the guidelines are addressed.

Addressing the Instruction -

Executive Order (E.O.) 12898 calls federal agencies to focus attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities.

NEPA's fundamental policy encourages productive and enjoyable harmony between humans and their environment. The NEPA statute recognizes that each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment.

CEQ General Principles on Environmental Justice

CEQ identifies environmental justice guidelines to assist federal agencies to address E.O. 12898 in implementing NEPA. Agencies should recognize that the question of whether agency action raises environmental justice issues is highly sensitive to the history or circumstances of a particular community or population, the particular type of environmental or human health impact, and the nature of the proposed action itself. There is not a standard formula for how environmental justice issues should be identified or addressed. However, CEQ identifies six principles providing general guidance.

The following discussion lists each of those six general principles and how the FEIS and project record address them and informs the Forest Service Responsible Official on environmental justice issues in issuing the Final ROD for the NorthMet Project Land Exchange.

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CEQ Guiding Principle - Consider the Composition of the Affected Area

- Agencies should consider the composition of the affected area, to determine whether minority populations, low-income populations, or Indian tribes are present in the area affected by the proposed action, and if so whether there may be disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, or Indian tribes.

FEIS addresses by -

Northmet Mining Project and Land Exchange FEIS determines that minority populations, low-income populations, and Indian tribes are present in the area affected by the proposed action. Section 4.2.10.1.1 describes the demographics of the three-county study area for the project in terms of population, age, race, income, poverty, and educational statistics.

Section 5.2.10.2.6 discloses effects on human health or environmental effects on minority populations, low-income populations, or Indian tribes. This section discusses potential effects of the proposed mining actions in terms of construction, operations, and reclamation.

CEQ Guiding Principle - Consider Potential for Exposure to Human Health or Environmental Hazards

- Agencies should consider relevant public health data and industry data concerning the potential for multiple or cumulative exposure to human health or environmental hazards in the affected population and historical patterns of exposure to environmental hazards, to the extent such information is reasonably available. For example, data may suggest there are disproportionately high and adverse human health or environmental effects on a minority population, low-income population, or Indian tribe from the agency action. Agencies should consider these multiple, or cumulative effects, even if certain effects are not within the control or subject to the discretion of the agency proposing the action.

FEIS addresses by -

Cumulative effects relating to environmental justice are assessed in section 6.2.10.4 of the FEIS. The FEIS states that while environmental justice effects could occur on properly zoned land, there is no evidence that these cumulative actions would generate environmental justice effects associated with economic factors. In addition, the FEIS states that there is no expected change in fish mercury concentrations, and no subsequent change in human health risks related to fish consumption (see Section 5.2.7.2.5).

CEQ Guiding Principle – Recognize Factors that May Amplify Effects

- Agencies should recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed agency action. These factors should include the physical sensitivity of the community or population to particular impacts; the effect of any disruption on the community structure associated with the proposed action; and the nature and degree of impact on the physical and social structure of the community.

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FEIS addresses by -

The interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the NorthMet Mining Project and Land Exchange have been thoroughly addressed through:

- The issues identification efforts including identifying potential factors amplifying natural and physical environmental effects are discussed in FEIS sections 2.2.2 Identification of Issues, 2.2.7 Receipt and Review of Public and Agency Comments, 2.3.2.1 Project Modifications, 2.3.6 Receipt and Review of Public and Agency Comments, and 2.4.1 Consideration of Public Comments Received on the SDEIS.

- Analysis of the existing condition in FEIS section 4.2.10. Specifically section 4.2.10.1.1 describes the demographics of the study area in terms of population, age, race, income, poverty, and educational statistics; and section 4.2.10.1.6 discusses conditions and definitions related to subsistence use in the study area. FEIS section 4.2.10 displays the effects analysis related to the factors identified in section 4.2.10. FEIS section 5.2.10.2.6 evaluates environmental justice effects, identifying the degree to which the potential effects of the NorthMet Project Proposed Action or any alternative are felt disproportionately across the community.

- Engaging with people living within the vicinity of the proposed activities through public meetings and open houses during scoping efforts and EIS comment periods. (See FEIS sections 2.2.1 NorthMet Project Scoping, 2.2.6 Comment Period and Public Meetings, 2.3.3.1 Land Exchange Scoping, 2.3.5 Comment Period and Public Meetings.)

- Consultation under section 106 of the National Historic Preservation Act (see FEIS section 4.2.9.2.1 National Historic Preservation Act Overview, 5.2.9 Cultural Resources, 5.3.9 Cultural Resources, 6.2.9 Cultural Resources, and 6.3.9 Cultural Resources),

- Engagement of local Bands of the Lake Superior Ojibwe, as cooperating agencies. (See FEIS section 1.2.2 Cooperating Agencies and Appendix A Table A-3 Cooperating Agency Comments and Responses Theme.)

- Government-to-government tribal consultation co-lead agencies have engaged in with the Bands throughout the course of the project analysis and decision making processes. (In addition to sections cited above, see FEIS Appendix A, Theme CR 06.)

CEQ Guiding Principle - Develop Effective Public Participation

- Agencies should develop effective public participation strategies. Agencies should, as appropriate, acknowledge and seek to overcome linguistic, cultural, institutional, geographic, and other barriers to meaningful participation, and should incorporate active outreach to affected groups.

FEIS addresses by -

Co-leads engaged with the public throughout the analysis process. Effective public participation on the proposed activities occurred directly in public meetings and open houses during scoping

efforts and EIS comment periods. Public participation also took place through formal public comment periods and through the Forest Service objections process. (See FEIS sections 2.2.1 NorthMet Project Scoping, 2.2.6 Comment Period and Public Meetings, 2.3.3.1 Land Exchange Scoping, 2.3.5 Comment Period and Public Meetings.)

Considerations in engaging with the public included ensuring accessible venues for public meetings, providing opportunities for people to comment as speakers, submit written comments by hand or through stenographers, and submit comments through postal mail and email. Co-lead agency staff also engaged directly with the public through personal communications, email, phone, and face-to-face meetings. All published documents for the public were designed to meet requirements of Section 508 of the Rehabilitation Act.

Engaging with people living within the vicinity of the proposed activities through public meetings and open houses during scoping efforts and EIS comment periods. (See FEIS sections 2.2.1 NorthMet Project Scoping, 2.2.6 Comment Period and Public Meetings, 2.3.3.1 Land Exchange Scoping, 2.3.5 Comment Period and Public Meetings.)

CEQ Guiding Principle - Assure Meaningful Community Representation

- Agencies should assure meaningful community representation in the process. Agencies should be aware of the diverse constituencies within any particular community when they seek community representation and should endeavor to have complete representation of the community as a whole. Agencies also should be aware that community participation must occur as early as possible if it is to be meaningful.

FEIS addresses by -

Co-lead agencies engaged with communities through public meetings held within venues in Aurora, Duluth, and the Twin Cities, where there are various communities keenly interested and potentially affected by the proposed mining and land exchange activities. Local citizens including a range of formal and informally recognized community leaders participated in these meetings. Tribal communities were not only engaged through the public meetings (tribal band representatives staffed an information station at the meetings), but also through the 106 process and effects analysis of cultural/heritage resources. Band elders, members, and resource specialists were interviewed on potential historic properties and effects of the proposed activities (project record). See FEIS sections 2.2.1 NorthMet Project Scoping, 2.2.6 Comment Period and Public Meetings, 2.3.3.1 Land Exchange Scoping, 2.3.5 Comment Period and Public Meetings.

CEQ Guiding Principle - Seek Tribal Representation

- Agencies should seek tribal representation in the process in a manner that is consistent with the government-to-government relationship between the United States and tribal governments, the federal government's trust responsibility to federally-recognized tribes, and any treaty rights.

FEIS addresses by -

Government-to-government relationship between the federal co-lead agencies and the Bands is addressed in the FEIS recognizing the federal government's trust responsibility to federally

recognized tribes and any treaty rights. See FEIS section 4.2.9.3.1 Federal Tribal Trust Responsibility, 5.2.7.2.5 Mercury Deposition Impact Analysis, 5.2.9 Cultural Resources, 5.2.9.2.2 1854 Treaty Resources, 5.3.1 Land Use, 5.3.1.2.1 Forest Available for Public Access and Use, 5.3.9 Cultural Resources, 5.3.9.2.1 Federal Lands, 5.3.9.2.2 Non-federal Lands, 8.0 Major Differences of Opinion, Appendix A Table A-3 Cooperating Agency Comments and Responses, and Appendix C Tribal Agency Position Supporting Materials.

Federal co-lead agencies have been engaged in government-to-government relationship activities with the Bands throughout the analysis process for this project. Meetings, correspondence, and agreements are documented in the project record.

Public Interest Factors

The public interest factors for the NorthMet Project Land Exchange identified in the FEIS Table 7.3.5-1 and Final ROD Table 2 summarize FEIS analysis that help illustrate effects of the NorthMet Mining Project and Land Exchange important to environmental justice issues. These tables in the FEIS and Final ROD also indicate where analysis in FEIS addresses the public interest factors. Public interest factors shown on the tables most directly related to environmental justice issues include:

- Opportunity to achieve better management of federal lands and resources and to meet the needs of state and local residents and their economies
- Secure important objectives, including but not limited to:
    - Protection of fish and wildlife habitats
    - Cultural resources
    - Watersheds
    - Wilderness and Special Designation Areas
    - Aesthetic values
- Consolidation of lands and/or interests in lands, such as mineral and timber interests, for more logical and efficient management and development
- Expansion of communities
- Accommodation of existing or planned land use authorizations
- Implementations of applicable Forest Land and Resource Management Plans
- Fulfillment of public needs